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ABSTRACT

The utility of negative evidence as input for grammar construction in second language learning is examined. Three issues are dealt with in this paper: (1) the arguments for and against negative evidence in first and second language acquisition are paralleled; (2) the question is situated within the larger issues of learner end-products and the logical problem of first and second language learning; and (3) the learner variable of metalinguistic sensitivity is considered. Because the problem of negative evidence hinges on individual differences in information-processing characteristics and is intimately linked to questions of variation in learner end-state competence, its role in second language acquisition is best considered an empirical rather than a theoretical issue. Sixty-one references are listed. (MSE)

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A ROLE FOR NEGATIVE EVIDENCE IN SECOND LANGUAGE ACQUISITION? *

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ABSTRACT

In second language acquisition theory, there is no consensus on the utility of negative evidence as input for grammar construction. Schwartz 1987, for example, rules out negative input on theory-internal grounds, while Bley-Vroman 1986 summons both empirical and theoretical arguments in favor of its operation. The present paper contributes to this debate (a) by paralleling the arguments for and against negative evidence in first and second language acquisition; (b) by situating the question of negative evidence within the larger issues of learner end-products and the "logical problem" of first and second language learning; and (c) by considering a learner variable of metalinguistic sensitivity (Bialystok & Ryan 1985, Olsen et al. 1983, *inter alia*), which affects the way all linguistic evidence—positive as well as negative—can serve as input to learning mechanisms. Inasmuch as the problem of negative evidence hinges on individual differences in information-processing characteristics, and is intimately linked to questions of variation in learner end-state competence, its role in second language acquisition is perhaps best considered an empirical issue rather than a theoretical one.

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INTRODUCTION. In early 1987 Jerry Fodor served as discussant at a colloquium at the University of South Florida.[1] Fodor opened his remarks by alluding to two parameters of scientific investigation. The first was what he called the Grandmother Condition. The Grandmother Condition specifies "that your psychological theory be no worse than that which your grandmother would've come up with." The second parameter was termed Falsism. According to Fodor, a falsism is "just like a truism except it's false". Webster's definition of a falsism would thus be "a statement the falsehood of which is obvious and well-known".

What if we applied Fodor's notions to second-language (L2) acquisition? If you were to ask your grandmother to explain what adult L2 acquisition is all about, her theory might be the one that sounds the simplest, namely, "Why, it's just like learning your first language." And many a current researcher in second language acquisition would feel vindicated. But then suppose you asked her how many people she knew who had mastered a second language, and you hinted that just about all children master their mother tongue, but adults hardly ever achieve native success in another language; and suppose further that you presented her with Bley-Vroman's account (in press) of a

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cornucopia of essential differences between first language (L1) acquisition and L2 acquisition. What would her theory of second language acquisition be then? The safe bet is that she would say something like, "Well, I don't know, but whatever it is, it's not like learning your first language." She might even volunteer, if she had Jerry Fodor's lexicon at her disposal, that her first theory had been nothing more than a falsism. And then of course other L2 acquisition researchers would feel vindicated. At which point someone else might chime in and suggest that the reason not all L2 learners master the target language is that they don't go about it like first language learners; if they did (or could) there would be no problem. What would Granny's newest theory be? My suspicion is she'd say, "It depends".

I am aware that my invoking of Fodor may come across as somewhat ironic, given that portions from his 1983 book, The Modularity of Mind, are used by Schwartz 1987 to support a position I feel is in need of refinement, namely, that negative evidence does not participate in L2 acquisition. I only allude to Fodor's Grandmother Condition and the idea of Falsism in hopes of promoting among readers of this paper a perceptual set on the question of negative evidence. On this complex and controversial issue, I would like to suggest that it would be prudent, at least for the time being, to lower our sights a bit and not aim for elegance or finality or theoretical orthodoxy. If the answer to the negative evidence question turns out to be, "It depends," so be it: our answer is no worse than what Granny would probably come up with. (In the meantime, we will keep our eyes peeled for falsisms.)

The present paper addresses the issue of negative evidence from three perspectives. First, we examine some of the objections to negative input raised in learnability theory, and apply these to L2. From there we proceed to the relevance of end-product data to the negative input question. In the third part, we introduce a learner variable of metalinguistic awareness, and speculate—within the parameters set up by Fodor—on the role this and related cognitive variables might play in redefining the negative evidence question.

1. BACKGROUND. The familiar starting point in discussions of negative evidence is, how do we know that sentences like those in (1) are not grammatical?

(1) Bill asked Fred, *"Which woman did you see John and?" *Fred reported Bill the sad truth.

Our knowledge of the sentences' grammatical status does not derive from our having been told that these sentences are deviant. By and large, information about ungrammaticality—negative evidence—simply is not available to learners. Thus, the hypotheses first language learners have about the structure of the ambient language are confirmed or falsified on the basis of positive evidence alone.

Negative evidence comes in several forms, as suggested by Berwick's 1985 classifications and the small sample given in (2). (For a more extensive sampling, see Pica 1987; Kingsley & Daubney-Davis 1987.)

(2) **Berwick 1985** [cited in Schwartz 1987]
"Explicit negative information is the (perhaps methodical) pairing of positive (syntactically well-formed) and negative (syntactically ill-formed) sentences with the appropriate labels well-formed and ill-formed. It could also include correction of ill-formed utterances (alternatively, parses) via (a) explicit negative reinforcement (e.g., *That's wrong*) or (b) tacit negative reinforcement (e.g., responding with the correct pattern, or not responding)."

Hirsh-Pasek et al. 1984
Explicit disapproval: *No, that's wrong.* or *That's not right.*
Repetitions with correction: *People lives in Florida*--› *People live in Florida*
Asymmetry: Mothers of 2-year-olds repeated more ill-formed sentences than well-formed ones.

Demetras et al. 1986
Correction: *No.* or *That's not right.*
Expanded repetition: *Daddy house*--› *Daddy's house, Baby sleeping*--› *Baby is sleeping*
Clarification questions: *Doggie go*--› *Did you take your doggie with you?*
Asymmetry: Mothers of 2-year-olds offered repetitions and clarifications in response to ill-formed child utterances more often than to well-formed ones.

Penner 1987
Verbal disagreement/disapproval: *No* or *That's wrong.*
Expansion: *Ball fall*--› *The ball fell down.*
Asymmetry: Parents expanded children's (MLU 2-2.5 and 3-3.5) ungrammatical utterances more often than grammatical utterances. [However, the category No Response more often followed grammatical than ungrammatical utterances (cf. Berwick 1985, above).]

Schachter 1986 [citing data from Day et al. 1981; Freed 1980; Schumann 1975]
Explicit Corrections (direct metalinguistic information):
Non-Native Speaker: Yes, left eye is wink.
Native Speaker: Left eye is winking.
NNS: Left eye is winking. (Day et al. 1981)

Contributors (direct metalinguistic information):
NNS: Return Iran this summer ... go back here in Autumn?
NS: Will come back?
NNS: Ah yes, will come back here in Autumn. (Freed 1980)

Confirmation checks (indirect metalinguistic information):
NNS: All the people think the Buddha is the people same.
NS: Same as the people?
NNS: Yeah. (Day et al. 1981)

Clarification requests (indirect metalinguistic information):
NNS: And when we go there we play too much.
NS: Too much?
NNS: Yeah.
NS: Or a lot? Do you play too much really?
NNS: Too much.
NS: You don't like to play too much?
NNS: Every day. (Schumann 1975)

Failures to understand (indirect metalinguistic information):
NNS: Um in Harvard, what you study?
NS: What?

NNS: What you es study?
NS: What am I studying?
NNS: Yeah. (Schumann 1975)

A casual glance at the examples above will reveal a difference between what is clearly explicit negative evidence (e.g. correction of learners' deviant utterances) and more implicit varieties such as recasts and expansions. In addition, despite certain terminological differences, the researchers cited tend to identify roughly the same types of linguistic data as potential negative evidence. There would seem to be little disagreement about what negative evidence *might be*--whether or not it is useful in language acquisition. [2] Moreover, in the relevant literature there is an unstated assumption that the same kinds of linguistic data qualify as negative evidence in both L2 and L1. Note, however, that at least for now we will not be dealing with a type of indirect negative evidence identified in Chomsky 1981, namely non-occurrence of certain linguistic forms. This type of evidence, by the way, *is* considered by Chomsky as relevant to acquisition.

Schwartz 1987 and other second-language theorists who believe that L1 and L2 are epistemologically similar (or identical) attempt to demonstrate that L2 learners have access to Universal Grammar--the same domain-specific cognitive faculty that presumably guides the acquisition of their first language. Such a demonstration would be enhanced, of course, by clear evidence that L2 acquisition, like L1 acquisition, does not rely on negative input.

2. COMPARING THE NEGATIVE EVIDENCE ISSUE IN L1 AND L2. Pinker 1987 refers to four criteria for deciding whether negative information is involved in language learning: (a) Negative evidence would have to exist; (b) Negative evidence, even if it exists, would have to be useful; (c) Negative evidence, even if present and useful, would have to be used; (d) Negative evidence, even if used, would have to be necessary. These criteria will be considered in turn.

Does negative input exist? According to Brown & Hanlon 1970, parents do not respond differentially to children as a function of the deviance or well-formedness of utterances. This finding has been challenged recently by Penner 1987, Hirsh-Pasek et al. 1984, and Demetras et al. 1985. In these studies, parents' responses, while not in the form of overt corrections, were asymmetrically distributed according to the grammaticality of their children's speech (see (2), above). Pinker questions the systematicity of the responses, however, noting for example considerable variation of response pattern from parent to parent and across children's age groups. In L2, the occurrence of negative evidence may depend on learning context. In traditional formal classroom settings there is an abundance of explicit negative evidence in the form of overt corrections. In naturalistic contexts, and in classrooms that try to approximate such contexts, explicit corrections may be infrequent, but there is no lack of what Berwick would call tacit negative evidence, falling under the categories of indirect metalinguistic information proposed by Schachter 1986 (refer to (2), above). Within this cross-context variability, there is no guarantee that the feedback will be given at all systematically. Thus, embedded in the availability question there is another question of the systematicity and universality of negative feedback.

Is negative information useful? Variants of this question have been asked by L2 theorists and foreign-language teachers for too long to remember. A complete answer would require teasing apart a host of cognitive and affective variables. A very narrow answer is possible, however, if we address just the concerns of Pinker 1987. Focusing on the feedback types isolated by Hirsh-Pasek et al. and Demetras et al., Pinker makes the point that these forms are *not unambiguous sources of information* about ungrammaticality. In the Hirsh-Pasek study, 20% of two-year olds' ungrammatical

utterances were repeated, but so were 12% of children's grammatical utterances. Pinker reasons that children who change their grammar so as to rule out utterances repeated by their parents would be improving their grammar a fifth of the time but making it worse an eighth of the time. Pinker goes on to assert that the forms of feedback in Demetras et al. do not distinguish grammar errors from other types of errors. Thus a mother's response to a pronunciation error might be misinterpreted as feedback about syntax, or vice versa.

Pinker appears to concede that these types of input may be present in L1, but their usefulness (or usability) is limited by the child's incapacity to extract unambiguous information from them. To make a similar case for adult L2 contexts, though, one would have to assume that children's hypothesis rejection algorithms (and children's processing of linguistic input generally) are maintained into adulthood. We will return to this topic below; for now, suffice it to say that this would require the denial of a lifetime's worth of accumulated knowledge about the subtleties of linguistic exchanges: knowledge, for example, of how to extract speakers' intended meanings; knowledge of what to attend to (see Slobin's 1973 operating principles); well-developed decision-making and inference routines, and so on. The example Schachter borrows from Freed 1980 (refer to (2)) suggests that these abilities are present and can be put to use by at least some L2 learners.

It is important to recognize that the usefulness question (for both L1 and L2) is complicated by the notorious phenomenon of backsliding, wherein learners demonstrate short-term remediation of linguistic deviance as a result of negative input, but quickly relapse into familiar (even fossilized) patterns of error. Clearly, the criterion of usefulness needs to be specified in terms of long- versus short-term behavioral effects.

Is negative information used? Pinker (1987: 10) affirms that the documentation on whether children are sensitive to this kind of input is sparse, as he cites only the celebrated Braine 1971 and McNeill 1966 anecdotes (in (3)) as evidence to suggest "that overt parental corrections may be fruitless in changing the grammar of the child".

(3) **McNeill 1966**:
Child (age not given): Nobody don't like me.
Mother: No, say, 'Nobody likes me.'
Child: Nobody don't like me.
(eight repetitions of this dialogue)
Mother: No, now listen carefully; say '*nobody likes me*.'
Child: Oh! Nobody don't like*s* me.

Braine 1971:
Child (2-1/2 years): Want other one spoon, Daddy.
Father: You mean, you want THE OTHER SPOON.
Child: Yes, I want other one spoon, please, Daddy.
Father: Can you say 'the other spoon'?
Child: Other...one...spoon.
Father: Say...'other'.
Child: Other.
Father: Spoon.
Child: Spoon.
Father: Other...spoon.
Child: Other...spoon. Now give me other one spoon?

In fact, the documentation may not be as skimpy as Pinker would have us believe. The example from Marshall & Morton 1978 given in (4) presents childrens' overt, on-line responses to various forms of parental negative input:

(4) **Marshall and Morton 1978**:
Child (4;11): I brang it home from school.
Adult: What?
Child: I bringed it home.
Adult: Eh?
Child: I brung it home.
Adult: Oy vay!
Child: Brought!
Adult: What d'you know--we finally made it!

The Marshall & Morton example is all the more interesting because the child appears to use constructively negative input that is subtle and not focused on the deviant verb morphology.

In the Freed example cited by Schachter (see (2)), an ability to use negative evidence seems to be present. The examples from Schumann, however, suggest quite the opposite. Judging from just these data, it would appear that use of negative evidence is a matter of individual and/or situational variation.

Significantly, all the examples just cited involve on-line reactions to negative input. It has been suggested by L1 researchers (see Karmiloff-Smith 1986; Bowerman 1987) that such evidence and even more subtle feedback on linguistic form may be employed by some children off-line.[3] If this is the case, the question of whether negative evidence is actually used by children cannot be settled by citing data from caretaker-child interactions alone (this point will be taken up again below). Needless to say, the same empirical obstacle confronts L2 researchers working with native-speaker (or teacher) interactions with learners.

Finally, we turn to criterion four: whether negative evidence is necessary. The standard nativist position is that it is inconceivable that all native speakers could have used sentences like those in (1), then repaired their grammars on the basis of negative feedback. The argument against the necessity of negative input is bolstered by the lack of data suggesting that the criteria of availability, usefulness, and actual use of negative input are uniformly met. The bottom line observation is that the documentation for negative evidence is not universal. And since native language acquisition does take place universally, negative input is relegated to a peripheral, idiosyncratic role at most. Thus, for example, even if negative evidence could in some way speed up learning, Pinker feels that language acquisition would happen anyway, and that negative evidence is not strictly necessary.

For L2 learning, Bley-Vroman 1986 argues that, for certain types of interlanguage hypotheses, negative evidence may be necessary for falsification. For example, a learner may believe that the utterance "hello" was appropriate for both greeting and leave-taking, analogous to *Aloha, Salut* or *Ciao*. Bley-Vroman summons evidence that L2 learners do entertain this kind of hypothesis, presumably through transfer from their native tongues. In principle, if this hypothesis were held by a first language learner, it might be disconfirmed by the learner's always hearing "goodbye" in contexts of parting. Bley-Vroman argues, however, that in L2 learning this type of falsification by positive evidence is not assured, as such incorrect forms often become fossilized. The case is not ironclad on this point, since it does not obviate the possibility that L2 learners could use non-occurrence as negative evidence; however, Bley-Vroman cites another type of hypothesis involving "hello" that is even more challenging to the positive-evidence-only position. Suppose the L2 learner thought

"hello" worked for greetings and partings, and amended to that hypothesis a notion of free variation (or dialectal variation), such that English speakers' saying "goodbye" was thought to be merely the use of an alternate form of "hello". In such a case, not even non-occurrence could suggest deviance. It is inconceivable that the incorrect hypothesis could ever be falsified without negative evidence. Suddenly the ball is back in the court of L1 researchers. Is the free-variation hypothesis a type of hypothesis that L1 learners are not innately predisposed to make? [4] Could this explain why children's language acquisition does not require negative evidence? Clearly, the negative evidence question ultimately must be answered within an independently-motivated theory of hypothesis types for L1 and L2 learners. We will return to this point below.

It would be tempting to say that there seem to be hypothesis types in L2 that do require negative evidence, and that L1 learners simply do not entertain such hypothesis types. Even if this theoretically elegant account turned out to be true, all we would have is a way of explaining how L2 learners can prevent or repair deviance and overgeneralizations using negative evidence. How would this rather restricted function fit into the big picture of successful L2 acquisition?

One might begin chipping away at this colossal empirical question by noting a conspicuous difference between L1 and L2 in the *types of data* that are thought to be pertinent to theory. In L1 acquisition theory, the negative evidence question can be dismissed by invoking the ultimate argument that learners universally succeed despite the non-universality of negative input. If we bring the necessity-of-negative-evidence issue to that level in L2, however, we find ourselves confronting the old nemesis of near-universal failure of L2 learners. The decisive end-product data in L1 just don't work for L2. Given that so few L2 learners succeed, the negative-evidence question has to be asked cautiously: specifically, it is important that one pin down *what negative evidence is necessary for*. What is the null hypothesis: that negative evidence is not necessary for success, or that negative evidence is not necessary for failure? This is not a facetious question: many researchers have argued that negative evidence—specifically, explicit negative evidence in the form of error correction—can impede acquisition (see Krashen 1981; Omaggio 1986). However, removing negative evidence from L2 contexts does not guarantee success. From the perspective of learners' end-state, one wonders why all the fuss over negative evidence if so few L2 learners ever learn anyway. Those, like Schwartz 1987, who believe that negative evidence is not needed in L2 because L2 acquisition and L1 acquisition are epistemologically identical, have yet to square their accounts with the dissimilarites of L1 and L2 in terms of end-product data, or learner success.

As a possible counterargument to this objection, one could maintain that "true" L2 acquisition (as opposed to L2 "learning", following Krashen's often-cited distinction) does work like L1 acquisition, in which case success would be assured. Overlooking the apparent circularity of this argument, one still must specify what is understood by "success". Two common measures of native-speakerhood are the ACTFL proficiency scale and intuitions for grammaticality. The well-known problems with these measures aside, if L2 acquisition were truly epistemologically like L1 acquisition, we would expect "success", or native-speaker-like behavior, on both these measures—and especially on the latter. However, in Coppieters' 1987 study, non-native speakers of French, who learned that language in adulthood—some in formal settings and some in informal settings—differed significantly from natives in their judgments of grammatical and ungrammatical French sentences. [5] This "lack of success" stands in stark contrast to the fact that all subjects had achieved an ACTFL rating of "superior"; according to Coppieters, they were indistinguishable from native speakers. Which of these performances—high proficiency or non-native intuitions—is the L2 = L1 equation prepared to take responsibility for?

End-product data can also be turned against the pro-negative-evidence accounts. Coppieters' breakdown of subjects by formal and informal learning contexts suggests that some subjects had more access to *explicit* negative evidence than others: why then is there no difference in either proficiency or intuitions that could be traced to this contingency? In view of the ambivalent character of learner success, it would seem that the question of a role for negative evidence in L2 is moot. We should not lose sight of the fact that negative evidence, even if it is used in hypothesis falsification and in the prevention and remediation of fossilization, is not sufficient--any more than other types of input--to bring adult learners' intuitions in line with those of native speakers.

3. INDIVIDUAL DIFFERENCES IN METALINGUISTIC AWARENESS. Adequate discussion of the negative evidence issue requires consideration of a learner variable that is currently under the microscope in L1 and L2 studies alike (e.g., Karmiloff-Smith 1986; Tunmer et al. 1984; Bialystok & Ryan 1985). Metalinguistic awareness is a perceptual and cognitive trait that can be loosely defined as sensitivity to formal aspects of language, and that is manifest in such behavior as detecting ambiguity and pronunciation errors, judgments of synonymity and grammaticality, and the like. Metalinguistic awareness is operative in everyday speech as well, as suggested by constructing a parallel sentence like, "John and Fred weigh 200 and 300 pounds respectively". The development of metalinguistic awareness is amply documented, as are individual differences (see, e.g. Van Kleeck 1982; Birdsong in preparation). The example in (5) was reported of a particularly metalinguistically precocious child:

(5) **Gleitman et al. 1972**:
Mother (taking car around a sharp bend): Hold on tight!
Child (<3;0): Isn't it *tightly*?

In contrast to examples in (3), this child's metalinguistic sensitivity is highly developed--to the point, in fact, that she is more interested in morphology than in impending disaster! The extent to which learners are metalinguistically aware depends on both endogenous factors such as high verbal intelligence and creativity, and exogenous factors such as exposure to language games and reinforcement of general linguistic skills (Van Kleeck 1982). The most significant co-variant of metalinguistic awareness is literacy. The jury is still out on whether literacy promotes metalinguistic ability or vice versa (see Bertelson 1986). It is clear, however, that the upper limits, in terms of types of metalinguistic performance and success within those tasks, are generally greater for schooled literates than for unschooled illiterates. Among speakers who never learn to read, metalinguistic awareness is extremely impoverished. Scholes and Willis in press have shown, for example, that illiterate adults, like illiterate children, judge well-formedness by semantic criteria: *John liked Mary* is judged acceptable, while *John pushed Mary* is judged unacceptable. Similarly, they are unable to perform simple phoneme-deletion tasks like, "If you take the /r/ sound out of 'frog', what word do you get?".

Variations in literacy and metalinguistic awareness are associated with individual differences in native-language mastery. Scholes and Willis document a pattern among illiterates whereby simple passives like "The boy was kissed by the girl" are understood as the boy doing the kissing. Scholes and Willis go on to show that nominalizations like "a man-eating lion" are interpreted as SVO structures (i.e., "a man is eating a lion"). The native language competence differences between literates and illiterates are so striking that Scholes and Willis argue that the two groups effectively possess different grammars.

The literacy-metalinguistic awareness connection also spells individual differences in the representation of linguistic knowledge. Olsen et. al. 1983 show that metalinguistic perspectives are trainable, so that, in terms of Bialystok and Ryan's 1985 metacognitive framework, we can expect inter-speaker differences in the way chunks of language are represented along the continuum of analyzed or unanalyzed knowledge. In a word, here is one more reason to believe that the way input is processed and represented is a matter of individual variation (see McLaughlin et al. 1983).

Two broad groups occupy opposite ends of the dimension of metalinguistic awareness: schooled literates and unschooled illiterates. I would like to use these two groups as bases for a bit of casual speculation on possible pragmatic consequences of a metalinguistic perspective. Scribner & Cole 1981, working with Vai bilingual illiterates in coastal Liberia, found their subjects' metalinguistic abilities to be practically nonexistent: they could recognize word order deviance in their native tongue—sentences on the model, "This house is fine very"—but not much more. In an intricate *pas de deux* between metalinguistic awareness and language proficiency, the limits of proficiency in both the native and non-native languages are circumscribed by their minimal metalinguistic awareness, which in turn is traceable to lack of schooling and to the lack of language-analytic abilities that come with literacy. [6] In the spirit of Scholes 1987, whatever the language acquisition device is, it is responsible for a *certain level* of linguistic achievement; achievement beyond that point is dependent on new ways of processing input. Partisans of the nativist paradigm might argue that Scribner & Cole's subjects learned both their languages by accessing UG, just like in L1—and, presumably, without negative evidence, since it is doubtful that, if any existed, they could have used it. As for the L2 intuitions of subjects like Scribner & Cole's, our knowledge of this area of linguistic competence is limited to only the most basic sentence types, making it impossible to compare natives' and non-natives' judgments of subtle and complex structures.

Schooled literates, unlike unschooled illiterates, have at their disposal learned systems for problem solving, along with well-developed metalinguistic awareness which identifies linguistic problems to be solved. Negative evidence is generally available and is often actively sought by some learners. In light of Coppieters' and others' findings that L2 learner intuitions do not coincide with those of native speakers, the usefulness of negative input may be limited to falsifying overgeneral hypotheses and enhancing skilled manipulation of surface structure. (Indeed, these limits may characterize the enterprise of adult L2 acquisition generally.)

The preceding speculations are meant to suggest that the issue of negative evidence should not be separated from questions of intake (see, e.g., Chaudron 1985), that is, linguistic material that is actually processed cognitively. Not all elements of the speech stream are attended to or understood; thus, it is not reasonable to assume that all features of ambient language qualify as input to learning mechanisms. What is intaken depends to some extent on learners' orientation to linguistic data. Clearly, the orientation to native speech of metalinguistically-aware learners will be different from that of learners with no metalinguistic sensitivity. In recognizing that notions of cognitive/perceptual variability and trainability are inherent in the negative input question, we align ourselves with the spirit of Felix's 1985 notion of a generalized problem solver in L2, Rutherford & Sharwood Smith's 1987 idea of consciousness raising as a facilitator of L2 acquisition, and Gass' 1983 enthusiasm for metalinguistic perspectives as aiding learning (see also Chaudron 1985, Kasper 1985, *inter alia*).

It must be emphasized that nothing approaching a full-blown theory of L2 acquisition has been proposed here. Rather, we have attempted to suggest that the question of negative evidence might constructively be removed from the domain of the strictly theoretical and explored within existing notions of L2 information-processing

(e.g. McLaughlin et al. 1983; Bialystok & Ryan 1985; Nation & McLaughlin 1986). Such a research programme might pursue the questions of whether metalinguistic awareness is an on-line or off-line operation, and whether levels of consciousness--in whatever precise psychological form this intuitive notion is articulated--can be or should be specified.

4. REMAINING ISSUES. The introduction of learner variables in metalinguistic awareness and information processing, and our insistence on empirical, in addition to theoretical, perspectives on the negative input question, raise a number of unanswered questions, several of which are addressed in the present section.

Linguistic level. In the literature, many of the discussions of negative input, both pro and contra, lump together deviance in surface morphological features (e.g. **Arang*) and lexical errors (e.g. "hello" used for leave-taking) with deviance in features of deep syntax (e.g. **Fred reported Bill the sad truth*), as if linguistic deviance were a monolithic concept. Can theoretical premises about negative evidence be applied to all levels of grammar? An affirmative answer to this question would suggest that learning itself takes place in the same way across all aspects of the target language. Yet we know, for example, that U-shaped behavioral growth characterizes some but not all aspects of language acquisition (see Bowerman 1982, Kellerman 1985); that is, the pattern of production of deviance and subsequent repair is not uniform for all linguistic structures. Further, the most rudimentary conception of the availability of negative evidence must take into account at least four contingencies, each with its own probabilistic weighting: (a) the production of a given error by the learner; (b) the interlocutor's having detected the deviance; (c) the interlocutor's decision to respond; and (d) the form of the interlocutor's response. Clearly, deviances such as **Arang* and **Fred reported Bill the sad truth* are not comparable in terms of all these contingencies. A plausible account of the role of negative evidence, whether in L1 or L2, must therefore eschew sweeping generalizations and focus on instantiations of narrow error types and interlocutors' responses to them.[7] Beyond this, one is forced to question the wisdom of invoking anecdotal evidence from one level of language, e.g. verb morphology or surface syntax, to settle questions of negative input in the acquisition of another level, e.g. abstract syntax. (This point is raised again below.)

Non-occurrence as negative evidence. A variety of linguistic evidence we have not yet confronted is the non-occurrence of structures hypothesized by the learner (Chomsky 1981: 8-9). Non-occurrence is the basis for rejection of a hypothesis when available input provides neither positive, confirming evidence nor unambiguous negative, disconfirming evidence for the hypothesis. A moment's reflection from the perspective of information processing is sufficient to suggest that a limited-capacity input processor would surely be taxed if required not only to attend to meaning and test hypotheses against positive data, but also to sift through masses of non-specific and irrelevant data necessary to conclude that a hypothesized structure is not possible in any context. A second drawback of using non-occurrence is that the necessary mode of reasoning is inductive and probabilistic. The learner's syllogism could be paraphrased as, "Since I haven't had confirmation or disconfirmation of my hypothesis, it is probably wrong and I should reject it." Inductive conclusions such as this are not infallible: it is possible that the very next sentence in the input could decisively reverse the conclusion induced from non-occurrence. Thus in terms of both efficiency and accuracy the use of non-occurrence to disconfirm hypotheses would seem to be far from an ideal learning mechanism.

Hypothesis disconf mation and individual differences. One wonders whether maintaining a vigil for non-occurring structures [8] is a hardwired and immutable method of hypothesis falsification that carries forth from birth into adulthood, or whether the input processor can learn to be more efficient. Can it learn to take a shortcut now and then, and attune itself to receive negative evidence as input to the learning mechanism? As Schachter (1983: 102) points out, "the most efficient way to test a hypothesis is to look for disconfirmation of it." Even White (1985: 38), writing within the UG/L2 paradigm, advances the efficacy, in principle, of negative data in second language acquisition.

Once again, however, the notion of individual differences applies. The literature on language development and metalinguistic abilities suggests both product and process differences among L1 and L2 learners (see, e.g., Birdsong in preparation; Maratsos 1983; McLaughlin et al. 1983). Similarly, in artificial language learning, there are the good performers and the bad ones, the novices and the experts (McLaughlin 1988; Nation & McLaughlin 1986). Not surprisingly, in SLA research, increasing attention is being paid to the contributions of experiential factors, perceptual differences, and cognitive variables relative to those of innate linguistic knowledge and knowledge of the L1 (see, e.g. Ioup 1988). In particular, experimental studies in cognition (reviewed by Anderson 1985: 287ff) have revealed striking differences among subjects in terms of their tendencies and abilities to seek, then use, disconfirming information for initial hypotheses. To the extent that language learning (particularly L2) involves hypothesis testing, it is possible that variable success derives, at least in some measure, from differential use of negative data.

A further dimension of the individual differences question is apparent in studies of problem solving. A number of researchers have cited the potential contributions of a generalized [9] problem-solving capacity to L2 acquisition (see, e.g. Bley-Vroman in press; McLaughlin 1988). The work of Sternberg and Davidson (e.g. Davidson & Sternberg 1986) amply demonstrates differences among individuals in the way they approach solutions to puzzles and problems of logic. Significantly, insightful problem solving skills can be trained. One of the major components of such training involves learning what information to attend to and what information to ignore. In the context of second-language learning, problem solving would seem to require rather advanced, or at least trainable, metalinguistic awareness in order to exploit the relevant parts of the available data. The attested variation among learners in this respect, coupled with other manifestations of individual differences in L2 information processing, would seem to add up to an argument for examining individual differences in the use of *all types of data*–positive evidence as well as various kinds of negative evidence–as input for learning. Future psycholinguistic studies may answer the question of whether skill in attending to and incorporating linguistic data in problem solving routines is a principal determinant of successful post-puberty L2 learning. At the very least, such research should illuminate the question of whether use of negative evidence is to be regarded as a generalized issue or a learner-specific one; as a purely theoretical matter or an empirical one. [10]

Classifying negative evidence: the learner's perspective. The dangers of generalizing the issue of negative evidence may also be noted in declarations of what is and is not negative evidence. For example, with reference to Berwick's category of "tacit negative reinforcement," one cannot assume that the child interprets the clarification question, "Did you take your doggie with you?" as a grammatical reformulation of "Doggie go", and thus as negative feedback. The same caveat applies to the parental reaction of not responding. A given non-response could be the result of anything from the parent's not hearing the child to the parent's choosing, for any number of reasons (fatigue, inattention, the phone ringing, etc.) to be silent. Indeed,

Berwick's assertion that "No Response" may be a form of tacit negative evidence is incompatible with Penner's finding that silence more often follows children's well-formed utterances than deviant ones.

What, then, qualifies as negative evidence? A liberal characterization, referred to since Brown & Hanlon 1970 by researchers in developmental psycholinguistics and learnability theorists alike, holds that negative evidence is supplied by differential responses to ungrammatical utterances vis-à-vis grammatical utterances, e.g., more expansions or recasts are given when the child produces a deviant structure than when the speech is grammatical. As Pinker 1987 points out, however, this type of evidence, like non-response, is ambiguous, since recasts and expansions are characteristic responses to both ungrammatical utterances and grammatical ones.

These and other learner- and situation-specific contingencies cloud the picture of what negative evidence might be. For example, returning to the definitions in (2), Berwick's classifications of explicit negative information and reinforcement may be uncontroversial, but the varieties of tacit negative information subsumed under Berwick's (b) are insensitive to questions of whether the child or L2 learner understands that a given response is a comment on or a correction of grammatical deviance.

While the perspective of the learner may obscure the question of negative evidence *qua* theoretical principle, it is essential to any functional characterization of the issue. That the functional angle should not be overlooked is suggested by Pinker's criteria that negative evidence must be useful and must be used. However, the learner's perspective does pose problems for these two notions. Pinker's argument against usefulness is based on the fact that the relative frequency of caretaker responses to grammatical utterances vis à vis ungrammatical utterances generates ambiguous input to the learner. Is this to say that all learners are unable to resolve the ambiguities? It may be that learner X is more capable in this respect than learner Y, or, perhaps, that a given learner may in time become more adept at extracting useful negative evidence. As for Pinker's claim that negative evidence is not *used*, recall that this position is based on observations of on-line exchanges, specifically, the McNeill 1966 and the Braine 1971 anecdotes. In the Pinker 1984 framework, reviewing of linguistic data may take place off-line. Is it not therefore possible that at least some children—perhaps even those cited by McNeill and Braine—resolve their learning problems off-line by reviewing the caretakers' negative input? [11]

Taking the perspective of the learner in determining what is functionally negative feedback does not, however, seriously threaten the nativist case against negative evidence. By and large, individual differences in metalinguistic awareness and information processing do not show up in the on-line data; it is impossible to know what is functionally negative input. Thus the limits of empirical observation restrict the reliable identification of negative evidence to explicit types. Since instances of these forms are admittedly rare, the nativist argument that negative input is neither necessary nor universal cannot be refuted with the experimental and observational data at our disposal. Also favoring the nativist position is the fact that, even when negative evidence for structural hypotheses is observed to be available, it seems to be directed at surface features, not at abstract features of syntax. Since this is the primary domain of learnability theory anyway, it is not necessary—nor, as we have already suggested, appropriate—to summon evidence against negative evidence from other levels of the grammar (e.g. the McNeill 1966 and Braine 1971 anecdotes).

There are, nevertheless, empirical problems for learnability accounts of L1 and L2 posed by taking the learner's perspective. The crucial premise in the learnability framework is that the learner entertains no hypothesis that cannot be disconfirmed with positive evidence. Recall, in contradistinction, that Bley-Vroman 1986 proposed that certain hypothesis types in L2 could not be rejected with positive evidence. As the

exchange in (6), below, suggests, some L1 hypothesis types would also seem to require something besides positive evidence in order to be rejected. It is important to note, however, that in this particular case, *the hypothesis resists disconfirmation, no matter what the evidence.*

(6) **Bever 1981**
Child (age not given): Mommy goed to the store.
Father: Mommy goed to the store?
Child: No, Daddy; *I* say it that way, not *you*!
Father: Mommy wented to the store?
Child: No!
Father: Mommy went to the store.
Child: That's right, Mommy wen ... Mommy goed to the store.

This child apparently hypothesizes that there are variants of proper grammatical form which are speaker-specific, or, alternatively, that children in general say things a certain way, while adults say them another way. How can the child disconfirm a hypothesis based on linguistic variation that says, in effect, "My grammar works like this; other grammars work differently"? Negative evidence is available, but is not used by the child. Indeed, it is rejected, since the child's hypothesis discounts its relevance to her grammar.

Significantly, the child appears quite metalinguistically aware, as she acknowledges the presence of what is nominally negative evidence. Yet even in cases of a conspiracy of negative evidence and metalinguistic sensitivity, there is no guarantee that on-line grammatical change will take place. Proper input and awareness may be necessary conditions for hypothesis modification, but they are clearly not sufficient for on-line hypothesis rejection.

What kind of evidence will ultimately bring the child around to say "went"? What kind of evidence will persuade the child to abandon the hypothesis that children and adults have different grammars? Is this a kind of hypothesis that is not part of the UG endowment of the child, but rather an isolated aberration traceable to idiosyncratic, exogenous factors? Is it particular to certain developmental stages, while UG-type hypotheses belong to other stages? [12] Should we expect the problem to be resolved off-line? On this and dozens of other mysteries of language learning, one can only conjecture.

5. **CONCLUSION.** Returning to the original question of a role for negative evidence in L2 acquisition, we are obliged to answer, "It depends". It depends on whether Pinker's four criteria are satisfied. It depends on whether (and what type of) end-product data are considered. It depends on whether on-line processing or off-line processing is involved. It depends on operative hypothesis types. It depends on the learning style of the individual, which may reflect the degree of sophistication of metalinguistically-sensitive systems for supplying various types of input into learning and problem-solving mechanisms. It depends on what level of the grammar is under consideration. It depends on what one means by "negative evidence". And it no doubt depends on many more variables than these.

However unsatisfying this litany of an answer may be, it is probably no worse than what Granny would've come up with. And, if "It depends" sounds like a truism, at least it doesn't sound like a falsism.

NOTES

* An abridged version of this paper was presented at the Tenth Annual Meeting of the American Association for Applied Linguistics, December 28, 1987.

1 Fodor's remarks prefaced his presentation as discussant for the Symposium on Learning, Memory, and Cognitive Theory, delivered to a colloquium entitled, "Speaking, Reading, Thinking, and Development: A Conference on the Accomplishments and Goals of Modern Research", held at the University of South Florida, January 16-18, 1987.

2 However, as we will attempt to show below, it is more reasonable to consider negative evidence from the perspective of the learner. That is, linguistic data properly serves as negative input for hypothesis-testing only when the learner understands that his/her utterance is deviant—whether so identified by a native speaker or teacher or inferred from non-occurrence.

3 I am grateful to Jeff Farrar (Department of Psychology, U. Florida) for bringing this distinction to my attention.

In the present paper, discussion of the on-line/off-line distinction—and of numerous other empirical and theoretical intricacies relative to the negative evidence question in L1—will necessarily be limited. As a rough-and-ready characterization, however, we follow Bowerman 1987 and use the term "on-line" to refer to cognitive behavior (specifically, hypothesis testing) that takes place in the course of language use. Most researchers apparently consider observable linguistic data (e.g. speech reflecting modification of originally deviant forms) as evidence for on-line operations; hence an implicit assumption that naturalistic speech and speech data elicited in experimental contexts are proper input to theory. Usually, the notion of "failure-driven" change (the child's production of a deviant form provokes a parental response indicating communication breakdown or ungrammaticality, which induces the child to modify that form) is associated with on-line processing. In contrast, there is "the idea that children (unconsciously) compare forms, extract regularities, and deepen their analyses 'off-line,' such that their grammars continue to develop even when they are not using them to process or produce speech. This approach is quite comfortable with evidence that children's grammars become more differentiated, better integrated, and more abstract even when children meet with no overt indications of trouble" (Bowerman 1987: 459). It is not clear, however, into which of the two categories one should place such cases as observed modifications produced several minutes (or conversational turns) after overt correction by the caretaker. For further discussion, see Bowerman 1987 and Karmiloff-Smith 1986.

In the context of the on-line/off-line distinction, the notoriously sticky question of "consciousness" inevitably arises. This issue is addressed in detail by Schmidt 1988. Presumably, what one actively attends to and notices in the input (cf. discussion of intake and metalinguistic awareness, below) is likely to have a different epistemological status, at least in the short term, from other elements of the speech stream. However, questions of "levels" and "types" of consciousness, and the role of such variables in hypothesis testing, problem solving, L1/L2 learning, etc., are far from resolved. For further discussion, see Birdsong, in preparation.

4 An example from Bever 1981, to be discussed below, would suggest that children do entertain certain hypotheses based on the premise of linguistic variation. It is unclear, however, whether this is an innate disposition. For discussion of the types of learner hypotheses that have been posited for L1 and L2, see Rutherford 1987.

5 Procedural problems with the Coppieters study do not seem to invalidate the general finding that natives and non-natives differ in their intuitions. Indeed, such a conclusion is reached in other studies as well: on the disparity between natives' and

"near"-natives' intuitions, see Liceras 1985; Snow & Meijer 1977. On differences in intuitions between fluent bilinguals and monolinguals, see Mack 1986.

6 A thorough treatment of the interplay of these factors may be found in Tunmer et al. 1984.

7 Responses to learner errors defy classification by broad error types; for an examination of learners' and native speakers' differential reactions to various errors (detection as well as evaluation), see Birdsong & Kassen in press. Birdsong & Kassen also discuss the role of negative evidence in shaping learners' evaluations of error severity.

8 The obvious analogy here is to "Waiting for Godot". In the final analysis, the non-occurrence postulate is surely not compatible with nativist L1 learning accounts, since much of the burden of language acquisition would have to be shifted from innate cognitive apparati to variables of input and input monitoring. For further discussion of this position, see Fodor & Crain 1987: 50ff.

9 That is, not specific to a putative cognitive domain that is responsible for language acquisition.

10 In fact, a pre-emptive focus on the negative-positive distinction from the theoretical perspective may obscure functional differences that obtain between other categories of response types. For example, it appears that certain parental response types are more likely than others to provoke ostensibly constructive linguistic behavior on the part of children. Farrar 1987 reports that children are more likely to provide immediate imitations of grammatical morphemes in response to recasts than in response to other parental discourse types. It not clear, however, (a) whether the child regards recasts as sources of linguistic evidence by which (s)he may modify his/her grammar, and for this reason engages in imitation, and (b) whether the act of immediate imitation is behavior that ultimately facilitates acquisition of the form in question. Once again, the critical empirical hurdle is not so much the type of input, but what the learner does with it.

11 We note parenthetically that considertion of the learner's perspective allows us to reflect on yet another variety of negative data. Presumably, there are many occasions when learners' hypotheses--but not actual learner utterances--are matched against native speakers' utterances. In such cases, what is negative feedback is not susceptible to observation; only the learner knows for sure.

12 Clark 1987 reviews a number of avatars of the notion (termed the Principle of Contrast; cf. the Uniqueness Principle) that children hypothesize a one-to-one relationship between form and meaning (i.e., that a given referent or meaning is associated with a single linguistic form). Assuming the operation and heuristic value of such a principle, it remains to be seen: when and why such a principle is modified in L1 acquisition to accommodate free variation; whether initial L2 learner hypotheses embody such a principle or assume free variation; and by what mechanisms and with what data free-variation type hypotheses can be confirmed or rejected.

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